National Biological Information Infrastructure

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ITIS and TRED: Accessing Taxonomic Information Through the NBII

The National Biological Information Infrastructure (NBII) Program has cooperated with several partner agencies and organizations to help provide access to two important sources of biological taxonomic information: the Integrated Taxonomic Information System (ITIS) and the Taxonomic Resources and Expertise Directory (TRED). These developments are momentous since biological taxonomic data and information are of fundamental importance in building the NBII.

Taxonomy, or systematics, is the discipline within the biological sciences concerned with the description and naming of the species of the world as well as the genetic and evolutionary relationships among these species. It is the science that defines and documents biological diversity. In short, taxonomic data and information are necessary to support all types of biological inventory, monitoring, and research. Further, the ability to refer to standardized taxonomic nomenclature (i.e., the names of species and other taxonomic groups) is a prerequisite for biological data sharing and comparison among different agencies and organizations. Standardized names of organisms let users look at synonyms or alternative names that have been used to describe the same species in different geographic regions or at different times.

Integrated Taxonomic Information System: ITIS is the first comprehensive, standardized reference for the scientific names — as well as synonyms and common names — for all the plants and animals of North America and the surrounding oceans. ITIS is being developed through the cooperative efforts of several Federal agencies, including the U.S. Geological Survey, Environmental Protection Agency, Natural Resources Conservation Service, Agricultural Research Service, National Oceanic and Atmospheric Administration, and the Smithsonian's National Museum of Natural History. In 1997, Canada (Research Agriculture Canada) and Mexico (CONABIO) joined in the ITIS partnership to cooperate in the development and maintenance of the ITIS database. ITIS is also a partner in the global Species 2000 program. The ITIS database is being made accessible for broad, continual use by government agencies, scientists, and the public by linking an advanced relational database to World Wide Web technology (http://www.itis.usda.gov/itis).

The goal of ITIS is to create an easily accessible, well-documented database with scientifically credible integrated information on species names and authors, their hierarchical classification, commonly used synonyms, vernacular names, species origin (native or introduced), and general distribution. The ITIS partner agencies collaborate with taxonomic specialists throughout the world who act as "stewards" to develop, review, and verify the reliability and quality of the data on the various taxonomic groups represented. ITIS data are reviewed periodically to ensure high quality with valid classifications, revisions, and additions of newly described species. The

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ITIS system can be used to let individual taxonomic experts compare their data against the ITIS standards. The ITIS system includes a PC-based tool, the "Taxonomic Workbench," that allows for quality-controlled data entry and update by ITIS cooperators on a distributed basis.

One of the major difficulties involved in the collection, exchange, and use of biological information is the lack of ready access to standardized information on the names and taxonomy of organisms. There are many different systems and approaches within the biological science community for how identified species should be classified and named. This has led to the relatively common situation in which the same species may be referred to under different names. Understandably, agencies and institutions that have made significant investments in gathering species-specific information according to one naming convention are reluctant to revise their existing information to adhere to another naming system. Without a standardized, central "authority," it is difficult — if not impossible — to compare, combine, and exchange biological information among such different distributed information sources. At the same time, the verification and tracking of species names that is required to develop this type of standardized authority is a highly resource-intensive enterprise that individual agencies working on their own have not been able to support.

Through the cooperation of the partner agencies and contributing scientists, ITIS is now providing a nomenclatural standard of accepted names that can be used as a common vocabulary linking biological information of all types developed by biological scientists from various disciplines.

Taxonomic Resources and Expertise Directory: TRED is an online dynamic directory of taxonomic specialists with expertise on the biological diversity of North America (north of Mexico) and adjacent oceans. To identify specialists with specific taxonomic expertise, Internet users can search the TRED directory in several ways: by biological group, by habitat and/or by geographic region address, by the taxonomic specialist's name. TRED (http://www.nbii.gov/tred) includes name, and some professional information on hundreds of taxonomic specialists. It also indicates if the specialist maintains a database for any particular biological group, such as birds or butterflies. In addition, taxonomic experts can submit or update their own contact and expertise information in the online directory.

TRED has been developed through the NBII Program in collaboration with the Association of Systematics Collections and the ITIS Federal agency partners. In addition to serving as an information resource for many different purposes, the TRED database is helping to enhance ITIS development. Many of the taxonomic specialists who are represented in the TRED have participated or may be asked to participate in developing, reviewing, or updating the scientific information in the ITIS database.